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A T H E S I S

PRESENTED FOR THE DEGREE

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BY

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NINE MONTHS IN MESOPOTAMIA IN 1916.

Our regimental chaplain often used to quote two verses, one in the Psalms, the other in Isaiah, containing the words "and the sun shall not smite thee by day", "like the shadow of a great rock in a weary land". And he used to say that he had never realised the significance of the word "smite", or so desired the "shadow of a great rock" until he found himself in Mesopotamia.

For this land, about which none of us seemed to have more than the haziest notion, we embarked at Devonport on February 16th 1916. There were about a hundred officers and about 2,500 men, being drafts for units already in Mesopotamia and various details. I might here say that of these hundred officers I could only hear of one, perhaps two, besides myself who had not died or been killed or invalided to India through sickness or wounds when I left the country in December 1916.

Our shrewd and genial Colonel commanding the troops on board said to me one day, "I don't like this going out to Mesopotamia, it's too far from home, they'll forget all about us".

Though the authorities at home had at this time come to know how things were out there, I still had cause to remember the Colonel's words.

The ship was overcrowded and consequently stuffy and dirty. The food was abundant, but indifferently cooked and badly served, and there was much grumbling. But soon most of us would have given much for a meal on the old transport, badly served and indifferently cooked as it was.

The medical officers were three leaving home but we picked up another at Port Said.

In addition to the routine work of seeing the morning sick, visiting the ships hospital, inspecting the sanitary arrangements, and the food and going round daily with the commanding officer, we were soon busy vaccinating all the troops against smallpox, and inoculating them with T.A.B. and anti-cholera vaccine, and giving lectures on the safeguarding of health in the tropics. The ship, escorted part of the way by destroyers, called at Malta, Port Said, Aden and Koweit. Koweit is on the Western side of the head of the Persian gulf and is a small friendly independent Arab state governed automatically by a Sheikh. Here possibly the Baghdad railway will one day terminate. Here we had to tranship into two smaller British India boats

which took us to Basra, 70 miles from the mouth of the Shatt-el-Arab. The latter is the name given to the river formed by the confluence of the Tigris and Euphrates at Kurnah about 120 miles from the sea and about 40 miles above Basra. The bar of the Shatt-el-Arab does not allow vessels of over 7,000 tons burden to pass. Even these bump and often stick. Such vessels can proceed to Basra, and smaller ocean-going vessels can also reach Kurnah. But above Kurnah only shallow draft flat-bottomed craft can negotiate the difficult navigation of the Tigris with its hair-pin bends and constantly shifting mud-banks.

We landed at Basra on March 24th 1916 and I was ordered to take temporary quarters on the S.S. Karadeniz^{near}, an old passenger boat captured from the Turks and then used as a convalescent hospital for officers and men.

The next day I was put on the staff of No. 3. British General Hospital in charge of 4 medical huts and renewed my South African War experience of some of the diseases of the Tropics. At this time there was an epidemic of relapsing fever which attacked half of a battalion in one of the rest camps. The sanitary arrangements of these rest camps then and for a long time after

was appalling. A big draft would disembark, be marched to the rest camp and in a short time rendered useless by dysentery and diarrhoea. The efforts of a friend of mine, a temporary captain in the R.A.M.C. who had been put in medical charge, were so energetic to improve matters that he was shifted off to the front to a cavalry regiment, though he had a discharging sinus in the hip leading down to diseased bone, and on account of which he was afterwards invalided. And the men who packed him off knew his condition'. This after we had been at least 16 months in occupation of Basra. One of the officers responsible for this state of affairs has been mentioned in dispatches, and is now a member of the Distinguished Service Order. The main part of No. 3. British General Hospital was housed in a permanent building - a palace. In this was the surgical side. The medical wards were huts with widely overhanging roofs of matting, the half open sides being of the same material. It had a laboratory and an X-Ray Department. How well equipped they were I was not competent to judge, but I understood that Sir Victor Horsley's verdict on the X-Ray department was the reverse of complimentary. However, a large amount of excellent work was done at the hospital, as all white cases from up stream were sorted out

here and either kept or sent on to India. The hospital site was right on the river bank or 'band' and opposite it was a pier alongside which the river hospital boats and the Bombay hospital ships moored.

Our troops were now pushing the Turks back above Sheikh Saad and a great effort was being made to relieve Kut-el-Amara. So in anticipation of heavy casualties six medical officers were ordered each to prepare a "river-boat unit". I was one of the six, and we all with our respective staffs, equipment and supplies left Basra on the 3rd of April for the front on the same paddle boat, reaching Wady, 11 miles above Sheikh Saad in the early morning of the 9th. Here we landed with our men and staff. Each was then attached to a Field ambulance tent subdivision or to a casualty clearing station for duty until orders came.

We were only a few miles behind the firing line and could hear the field guns and at night see the flashes. Unluckily I now was attacked by a 3 day fever, very like the fever I got in July, diagnosed sandfly fever. This was followed by bloody diarrhoea and rendered me unable to help in dealing with the many wounded steadily being brought back from the trenches.

I was in this condition, when on the

evening of Thursday, April 13th, orders arrived to board a paddle boat with my personnel and equipment and prepare her and the two barges (one on each side) for the reception of wounded.

My staff consisted of:-

Temporary Lieutenant K. B. Kanga, I.M.S., a Parsi.

1 Assistant Surgeon, Indian Subordinate Medical Department.

1 Native Sub-assistant Surgeon, Indian Subordinate Medical Department.

4 British nursing orderlies, from combatant units, untrained.

4 Native Ward orderlies.

2 British Cooks.

3 Native Cooks.

1 Native Storekeeper.

6 Native Sweepers.

The scale of equipment laid down to be taken by each River Boat Medical Unit was as follows. But it was not nearly sufficient and had to be supplemented by begging, borrowing, and perhaps stealing. The Red Cross Depôt at Basra provided a lot of comforts and clothing. This organisation, together with similar organisations in India proved from this time on a great boon to officers and men.

Comforts

Boxes of Milk	10
Sago	20 lbs
Sugar	80 lbs
Arrowroot	10 lbs
Tea	20 lbs
Butter	20 lbs
Essence of Mutton	10 lbs
Extract of Beef	5 lbs
Brandy	6 Bottles
Whiskey	6 Bottles
Champagne	5 Bottles
Cigarettes	2,500
Horlick's Malted Milk	10 Bottles

Equipment

Medical Panniers (or equivalent)	1 pair
Boxes Dressings and Surgical Appliances	8
Persian Water Boilers	2
Blankets	50
Refr ² ais (a sort of quilt)	50
Camp Beds	20
Commodos, folding	2
Bed Pans	10
Urinals	10
Buckets, for drinking water.	2
Empty Kerosene Tins	20
Lanterns	4
Kerosene Oil	1 tin

Equipment (continued) -

Cooking Pots for British Troops	6
Knives, forks, spoons, plates, mugs.	100 of each
Cooking pots for Hindus	1 set
" " " Mohammedans	1 "
Large Degshis	1 nest
Lotas	25
Mohammedan Drinking Vessels	25

In addition stretchers and mattress cases as many as could be got.

Even the above could not be all supplied at the Base. However, by improvisation, and borrowing and requisitioning at Amara and the front we managed to get most of what was required. Ordinary rations were drawn whenever possible.

Loading began at 10 a.m. on the morning of Friday, the 14th of April in wind and pouring rain and owing to deficient awnings on wet decks. All the sick and wounded were got on board in 3½ hours but it was 5 p.m. before we had got things settled down. The wind being high and off shore we failed to sail until the next day, at 10 a.m. Amarah was reached the same night at dusk. Here the officers were provided with dinner and the men with cocoa and bread-butter. and the following morning with hard boiled eggs. The barges were swept out and ~~we~~ were helped in every way.

The Vincent-Bingley Commission had now begun its inquiry. A case of gunshot wound of the spine with paraplegia died, the body was put ashore at Amarah. A similar case, evidently dying, and a case of fracture of the femur in bad position were also put ashore.

We left Amarah at 10-15 a.m. on Sunday, April 16th, and reached Basra at noon the following day. The ship was clear of patients and equipment by 3-45 p.m. Many of the patients were immediately transferred to a hospital ship for Bombay, the remainder of the British troops being admitted to the British General Hospital and the natives to the Indian General Hospital. It is remarkable how cheerful and patient were the officers and men in spite of the fact of severe wounds, dangerous illnesses, and uncomfortable conditions.

The number of British Troops on board was 173 including 16 officers, of Indian Troops was 100, including 9 officers.

I screened off 8 feet of the after portion of the upper deck and there arranged our boxes of medical equipment and our own camp beds, and there Lieut. Kanga and myself slept and fed. There also lotions and dressings were prepared and a few walking cases had their wounds attended to.

It had been my intention to bring stretcher cases into this area, supporting the stretchers on two boxes, and so enabling us to give the patient

a good clean up. This we found impossible because firstly we had not reserved enough space, secondly the deck was so overcrowded with patients that it would have been very difficult to bring the ~~shelter~~^{stretchers} along. So we had to do the best with them where they lay, even passing catheters on the five cases of paraplegia we had on board.

This overcrowding was very objectionable in many ways-

- (1) In getting from one part of the deck to another one either had to go a long way round, stepping warily, or one had to take a short cut between two patients, treading on their blankets or mattresses.
- (2) In dressing cases e.g. compound fracture of the femur, the difficulty of getting at the wound satisfactorily, especially a posterior one, can be imagined. (I didn't see any of Thomas' hip splints) The dressing trays, and lotion basins had often to be put on the bodies of adjoining patients.
- (3) The difficulty of applying the bed pan properly, and there were many cases of dysentery and diarrhoea, of washing the patients, of getting rid of the remains of food, and of dust. Dust pans would have been very useful.
- (4) The whole deck could be cleaned by instalments if there were room to shift patients to. As it was the decks and bedding became indescribably filthy and thus aggravated the plague of flies (Face pieces cut out of surgical gauze were a great comfort).

This brings me to the subject of Protection from sun and rain. On this particular paddle boat, not only were there large gaps between its sections and round the funnels and stays, but the outer edges also were widely deficient. Consequently as it was raining heavily when we loaded, a portion of the deck was awash, and mattresses had to be laid on it in that condition. This in addition to the mud brought off the bank by the feet of stretcher bearers and of others made it a cheerful sight. The paddle boat itself had efficient side curtains. The barges had none. The awning canvas was very thin and a single layer was not sufficient protection against the sun even in April.

Stores. I was very unfortunate in the site chosen for stores. It was ~~at~~ⁱⁿ on the lower deck where I could not see them without making a special journey and where they were at the mercy of the crew, followers etc. No doubt much was stolen. A better site for them had been taken over by mail bags before we boarded the ship. I then had not realised the importance of a site on the upper deck or on one of the barges. A portion could have been screened off ~~and~~ the storekeeper could have slept there. It would have been a great comfort, saved space and added to efficiency if it had been arranged to ~~miss~~^{miss} the medical officers with the ships officers.

Stretchers would have been better than mattresses. The latter are bulky, become and look

filthy. Stretchers of suitable cases could be stacked during the day and the deck could be cleaned.

Duration of Journey. It would have been a great advantage to the patients and would have accelerated the whole service could the boats travel by night. The navigation of the river is, however, too difficult. I believe searchlights which have been since tried have not proved a great success.

Staff. I was busy the whole journey. Another assistant surgeon should have been added to give me more time for the work of supervision. The staff was too small for the efficient performance of night duty, and I had to make use of the eight officers' servants who were on board.

After renewing my equipment and supplies in readiness for another trip up river, I was again posted to the British General Hospital. But owing to casualties and sickness having caused a shortage of medical officers in the 13th Division, April 26th found me beginning my second and last journey to the front. I was lucky to get a passage on the Hospital Ship "Sikhim", the first of its kind on the Tigris and which was now doing its fourth or fifth voyage up stream. Bully beef, army biscuits and raw onions were my mainstay. Sir Victor Horsley was one of the passengers and I heard him give vent freely to his opinion of the "scandalous" conduct of the campaign. When he spoke he appeared to be entirely detached from his surroundings.

He did not care who heard him or whom he might offend and he offended many. His militant teetotalism was not popular. He was full of energy. The heat of the Mesopotamian day did not deter him from tours of inspection etc, and this disrespect for the tropical sun undoubtedly led to his death. His case was actually used as an argument against teetotalism. The hot climate maxim "no drink before sundown" was pretty faithfully observed, and though a teetotaler myself, I can imagine that some stimulant is good towards the close of an exhausting day. Some days towards sundown one felt absolutely "done", and many life-long teetotalers changed their views of alcohol in Mesopotamia. Sir Victor Horsley was a very great man, and the type of man required to expose the indifference, inefficiency and inertia of the Indian Government. Personally I believe that the East has a baneful influence on the character of the average man.

As the "Sikhim" approached Sheikh Sa'ad in the afternoon of Saturday, April the 29th, a huge black column of smoke was seen to the W.S.W. No one could give a satisfactory explanation. At 2-40 we tied up at Sheikh Sa'ad and the officer who came on board gave us in a low voice the sad news that Kut had surrendered and that Townshend would march out at 3 o'clock. The column of smoke

was from his burning stores. There were only whispers on board for a time, indicating the depression which everyone felt. That night we anchored at Orah and the next day at Sandy Ridge, the headquarters of General Gorringe, commanding the Tigris Army Corps. On Monday, May 1st, I joined the 41st Field Ambulance at Ab^u Ro^uan a few miles higher up the right bank of the river and opposite the San^{ti}-i-yat position held by the Turks on the left bank. Here I spent a miserable period of five weeks. Heat, dust, flies, shells, bombs from aeroplanes and very poor food were our portion; the treatment of cholera, dysentery and diarrhoea our work. We were ordered to take no cases into our ambulance except those of the three diseases mentioned, one section of the ambulance being pitched a little to one side for the reception of cholera patients. We had a daily average of four to five hundred patients. Sometimes the number went up to seven and eight hundred. The river transport was so occupied that we couldn't get them away. This sort of thing went on the whole summer, and to relieve the congestion in the ambulances, a convalescent camp was formed close by under a combatant officer. This was visited twice daily by one of our medical officers. One of my duties was to take the history of each case on admission, describe the macroscopical appearance and make a smear of his motion, and also take a specimen of his blood in a Wrights' capsule.

These were afterwards examined by Major Gloster I.M.S. Unfortunately my notes have been lost. The idea was to see whether some of the cases of so-called diarrhoea were "cholera carriers". The cholera germ was certainly present, and the blood reacted in a few cases, and these were put in quarantine. My impression is the injection of anti-cholera vaccine is a good thing, and the transfusion of saline good treatment. When it became too hot for flies, the cholera epidemic lessened. The poor fellows in the ambulance were a pitiable sight, with their sunken cheeks and eyeballs, some being hardly able to stand even on admission, too weak to brush away the flies which festooned their mouths, nostrils and eyelids, and some dying in the receiving tent. The morale of our troops was now very low. There was not a kick left in them. Officers and men were alike. The supply of drugs was by no means ample, and we had to be careful with the milk. The stock drug treatment of diarrhoea was of course Castor Oil or Calomel followed by Bismuth and Chlorodyne or Dover Powder. Magnesium Sulphate in fractional repeated doses was successful in many cases, as was experienced in the South African War.

During my stay in the country and for some time after I had left it, I had an attack of diarrhoea

every three or four weeks. This would last 3- 4 days and leave me horribly weak, after one attack being unable to stand on my feet. Another attack left me jaundiced. My weight came down from twelve to nine stones. The nature of the diarrhoea I don't know, but *amoeba* were looked for and not found.

Early in June the ambulance was shifted to a site on the river bank. This was a change immensely for the better. The wind which blew steadily practically the whole summer from about N-N.W. came across the river and consequently as there was no transport road between us and the bank we got far less dust than on the previous site. The temperature on the river and near it is certainly lower, even 10 degrees, than inland, and the wind has not so much of that scorching quality which it has after passing over sunbaked ground. Sometimes it was as if one stood before an open furnace. We could also bathe readily. This we did in the early morning and at sundown and most refreshing it was. The river was now in flood and care had to be taken to avoid the current. We chose a part where the water was either stationary or flowed up stream. Many were drowned in the Tigris. It was a very poor look-out indeed for a man who fell overboard. It used to be said that on an average each boat lost a man a trip. One cause of falling over-board was this.- A boat carried rapidly

round a sharp bend of the river by the current had to bump against the outside bank. Tommy, careless as usual, would perhaps be standing or sitting at the edge of the boat or barge, and over he would go. If he had his equipment on he would be seen no more. A man bathing and apparently swimming strongly would suddenly disappear. Whether drawn under by a vortex, whether heart failure or seizure by a fish was the cause of his disappearance could not be made out. Sharks come up from the Persian Gulf in the Summer and fish of the salmon type weighing some of them over a hundred pounds are caught. The state of the river does not depend on the local rainfall which really is comparatively scanty. It depends on the rainfall and the melting of the snows in the mountains from which the Tigris and Euphrates rise. So the river continues to rise until June - July, then it falls gradually until October or November, and then slowly rises again. In January the rise is a little more rapid but the great rise doesn't occur until April and May when the snows melt. I've seen the snow on the ^{ush?i} ~~Pashk~~-Kuh mountains 50 miles away, when we were literally baking on the plain. The river falls at least thirty feet, and during the fall, before it has found its permanent channel, the navigation is most difficult because of the shifting mudbanks.

On the 15th of June I was ordered to accompany the convalescent camp to Sheikh Sa'ad 30 miles down stream. Part of the 13th Division had already moved there and the remainder was soon to follow. The idea was to rest and to get the units up to strength again. Neither of these objects was accomplished there. The men had to unload ships, build redoubts and dig trenches, and every night the Arabs kept us busy.

The Arab with his dignified gait, erect attitude and proud expression is the biggest and cleverest horse and rifle thief in the world. Officers who had served on the Indian frontier told me that the natives there were not equal to them. The best horses would be picked out and taken away from the centre of a brigade camp in spite of flares barbed wire, double quarter guard, inlying picquets, outlying picquets, intermediate posts and redoubts. Each man had to dig a hole for his rifle, place his ground sheet over and lie on it. Yet the rifle might disappear. One night four officers of the battalion next door had their revolvers taken from under their pillows. I always kept mine by the right thigh. That was considered the safest place and quickest to get at. An Arab would enter an officer's tent, take his pick of clothing etc, and vanish without sound or sign. One night they cleared off with a thousand sheep from a post of ours. It seems incredible but it's a fact. There were alarms almost

every night. No one was allowed to leave the precincts of the camp after dark without arms and an armed escort. This sort of thing was not productive of the desired 'rest' and as for getting up the strength of a unit, disease effectively prevented that.

The battalion I was now attached to reached Sheikh Sa'ad from the trenches one hundred and eighty strong. A draft ^{arrived} bringing it up to four hundred. In a few weeks it was down again to two hundred. This was repeated at least three times and when we arrived at Amarah on the 27th of September, we were only just over two hundred. On the 16th of July, 25% of the ration strength of the Division at Sheikh Sa'ad was in the Field Ambulances. And no doubt each battalion would have ten to twenty men lying in its hospital tent and would have the same number excused duty.

The climate was extremely trying, in fact terrible. One man said "If I knew that there was no alternative but to spend another summer here under these conditions I would shoot myself now". There were men who had travelled far and wide. In fact there was hardly a country which had not been lived in by someone or other of those we knew. They all said Mesopotamia was the worst country they had struck.

But perhaps under suitable conditions, and a

hill station in the Push-ti-Kuh life would be as tolerable as in the hot parts of India. Such conditions would include a sunproof building with wide verandahs built on the river-bank, punkahs and fans, apparatus for sedimentation and sterilization of water, abundance of netting (metal+muslin) to keep out the housefly, sand fly and mosquito, and plenty of paraffin to kill them, a good appetisingly cooked and varied dietary, and 4 or 5 months leave of absence every year.

Regarding diet I held a theory which failed to stand the test of experience. The theory was that because the use of food is partly to maintain the body temperature, and as the temperature of the surrounding air was higher than that of the body, it would be better to restrict the diet as much as possible. I found out that the great majority of men who did eat a lot, not to mention those who didnt, became emaciated. The arm, thigh, and calf measurements went down inches, the abdomen retracted and a previously well-fitting coat hung loosely. I had not realised the struggle for existence in such a climate. I had not then heard the expression at sunrise, "My God, another day to get through". I did not know of the mental depression produced. The strain on the nervous system was great. It must have been hard work for the heat-regulating centres. This required good food and plenty of it. The difficulty was to get it palatable and varied. I reckoned that I drank two

gallons or more a day. I didnt measure the amount excreted by the kidneys but I'm sure it was less then a pint. Our clothes became white from the salts of the evaporated sweat. A man well covered with flesh could almost be guaranteed to be in good health. The difficulty of convalescence in such a climate after diarrhoea and fever, with a poor appetite and unpalatable food can be imagined.

One of the problems out there was how to keep cool. On July 12th the temperature was 126 degrees in the shade. The temperature was taken daily by the A.D.M.S. at divisional headquarters in a 40 lb tent pitched inside an 80 pounder. The tent was open at both ends allowing a breeze, if any, to pass through. The string by which the thermometer was suspended from the tent roof was led over a canvas bag containing water, so that no heat could get to it along the string. Both tents being double, there were four layers of canvas between it and the sun, and radiation from the earth was intercepted by matting. I dont now remember but probably there were blankets or matting thrown over the outside tent. As a rule the difference between the night and day temperature was 30 degrees. The temperature at Basra was not so high. This was probably due to the numerous creeks and swamps there, evaporation from them cooling the air, But the higher temperature at Sheikh Sa'ad was from all accounts more tolerable than the lower temperature

at Basra owing to the greater dryness of the atmosphere at the former place allowing freer evaporation of the sweat.

On June the 9th when the temperature was only 112 degrees, I took a cupful of cold water from my chattie, cooled my clinical thermometer in it and shook down the mercury. I then left it standing in the cup of water on the table in my tent. It soon registered 99 degrees. During the hot weather no one left his tent between the hours of 10 a.m. and 4 p.m. except to run across to the mess tent luncheon time or for urgent business. "Avoid the sun as you would your greatest enemy". Even in your tent it was advisable to wear a helmet or a towel. A wet towel worn like a shawl was very nice. When one had to go out during the day it was essential to wear a tunic or a spine pad. It was really cooler to wear a fairly thick shirt, or a thin shirt and a thin undervest. During the day after the mornings' work was done most people got into pyjamas till tea time, passing the time by reading, writing, talking, and sleeping. Some could actually play cards. It was impossible to do any heavy reading. It was too hot to think. Tommy didn't begin to, sing till September. A good thick head of hair was a great asset and probably the fashion of keeping the hair short, especially at the nape of the neck, was a mistake. A bath in your tent especially

about teatime was a great relief. It cooled you and took the accumulation of dust off you.

A friend of mine, a padre spent many an afternoon sitting on the edge of his bed with a wet towel on his head and his feet in water. Its decidedly cooler to lie on your bed in your tent with pyjamas on than naked. The pyjamas absorb the sweat and act as a wet pack. Naked the sweat collects in a pool under you and the cooling effect of its evaporation from the skin is lost.

Most of us were in double bell tents until the middle of July when we were put into the infinitely superior E.P.tents. The canvas of the bell tents was more of a rainproof than a sunproof material and so I stitched some blankets on the outer side of the inner fly. It was important to pitch the tent with the door facing north. To have the sun shining straight into your tent would be intolerable.

I always kept the tent curtain down on the sunward side and up on the other side, for though the sun did not shine directly into the tent that way its heat was reflected from the earth with great effect.

Any metal object in the tent was uncomfortably hot to touch. No bed covering was necessary at night in June, July and August. One went to sleep bathed in perspiration. The first extra clothing I put on at night was a knitted abdominal belt, slipping it on before going to sleep.

One felt very oppressed sometimes at about 7 a.m.

and again towards sundown. At 7 a.m. as a rule there was no breeze, at sundown one was exhausted after going through a trying day. Another contributory explanation may be that the rays of the sun being horizontal would strike the back at right angles and thus have less tissue to traverse to reach the spinal cord.

The inclination to smoke was less than at home, and for some reason or other many had to give up their pipes, and use cigarettes only.

I kept no diary but I always had a letter to my wife on the go to which I added a little every day. Those that reached home I've just read and they are very feeble because they had to pass the censor and had to be written so as not to alarm or worry my wife. However I think it not amiss before going further to record a few dates and notes from them referring chiefly to the climate.

April 17th. ^{riv}Armed Basra from Wady with wounded.

" 18th. Quite hot, like the hottest summer's day at home.

" 29th. At Sheikh Sa'ad. Surrender of Kut.

May 1st. At Sandy Ridge. Fly pest getting worse and worse. Joined 41st Field Ambulance at Ab^u Roman. very dusty.

" 3rd. Hospital Ship "Sikhim" passed down stream with patients from Kut garrison.

" 4th. Filtering water through an emergency ration bag. very dusty.

May 8th. 11.10 a.m. quite hot.

" 9th. 11 a.m. Went for a walk, found it too hot. slept in the open at night. Mornings and evenings lovely, but the days baking hot.

" 10th. Dust storm.

" 11th. Gave up wearing collars.

" 18th. Temp. 108 degrees. Broiling hot. 6 p.m. cooling down a bit.

" 19th. Temp. 110 degrees. In tent only shirt and slippers on. Father Colley keeping cool by wet towel on his head and feet in water.

June 2nd. Nice cool breeze blowing from across the river. quite chilly at dawn - a welcome change,

June 4th. 7.45 a.m. Beautiful cool breeze from N.W. blowing for last few days. A skipper said very hot at Basra, much worse than at Mason's Mounds.

" 6th. Lark singing.

" 8th. Temp. 108 degrees.

" 9th. Temp. 112 degrees. Awfully hot 9-30 a.m. Scorching East wind with dust.

" 12th. Temp. 116 degrees.

" 15th. Dust "devils".

" 16th. Joined 8th Cheshire Regiment at Sheikh Sa'ad. seeing morning sick at 5 a.m. Sunset 7.15 p.m. Wind scorching. Tea at 5 better than at 4 o'clock. Too hot at 4.

" 22nd. Very hot. sewed three blankets outside inner wall of my bell tent.

" 28th. Sun sets at 7 p.m. short twilight. too dark to write at 7-45 p.m. necessary to wear helmet or towel in tent.

July 4th. It's a trial writing letters in this wind heat and dust,

" 6th. Housefly now no worse than at home.

" 8th. Temp. 123 degrees. nights comparatively cool.

" 10th. " 124 " nice breeze blowing. Sweat runs into your eyes and being salty makes them burn.

July 12th. Temp. 126 degrees. Sun rises exactly at 5 a.m. about 5 p.m. begins to get cool.

" 20th. Horribly windy and dusty - awful. Couldn't find way about owing to dust storm. Even my horse couldn't.

" 21st. A patient in 39th Field Ambulance with Sandfly Fever.

" 26th. Nights beginning to get hot. not below 100 degrees. Day temperature never less than 120 degrees. Dust horrible.

" 31st. Windy and dusty.

August 1st. Temp. 117 degrees. Hot, windy, dusty.

" 3rd. " 119 " Windy, dusty. Wind rises 8- 9 a.m. dies down about 6 p.m. Night and early morning fairly calm.

" 4th. No sleep owing to sand flies, Wind had dropped so they collected.

" 5th. Temp. 119 degrees. Dust, sand flies.

" 6th. " 120 "

" 9th. One of dustiest days. cooler when dust screens the sun.

" 12th. Temp. 117 degrees.

" 13th. Hot, windy, dusty, - nights cooler.

" 16th. Blowing all last night with dust, and quite a gale today. men losing their way - about worst day we've had.

" 17th. Begun to wear body belt at night but no sheet or blanket.

" 20th. Early mornings lovely before heat and dust come.

" 23rd. Temp. 115 degrees.

" 25th. A few clouds in the sky this morning.

" 26th. 9 a.m. wind and dust.

Sept. 1st. House flies have come back - still sand flies, but none in winter, comparatively free from dust.

- September 3rd. Hot, windy, horribly dusty.
- " 4th. " " " "
- " 6th 7 a.m. beautiful cool morning, last two or three nights had to wrap sheet round me.
- " 9th Temp. 112 degrees. Sheikh Sa'ad. camp shifted to river bank. Wind changed to S. has been blowing from N.W. for months. Nights much cooler, got under a blanket.
- " 10th. Temp. 114 degrees.
- " 11th. Weather ideal morning and evening, no dust.
- " 12th. Temp. day 98 degrees, night 68 deg. Bath before tea quite cold - had to wear tunic before finishing dinner. Still have to wear helmet outside tent.
- " 13th. Temp. 104 degrees. River by this has fallen 30 feet.
- " 14th. 5 a.m. quite cold. 7-30 a.m. still cold, with tunics on.
- " 15th. Temp. 107 degrees.
- " 16th. Temp. 108 degrees - last night too hot for a blanket.
- " 17th. Temp. 108 degrees.
- " 19th. Left Sheikh Sa'ad by road, for Amarah at 6 p.m.
- " 20th. Still very hot during the day, but nothing like what it was.
- " 22nd. Arrived at Ali-el-Gharbi. Better health on trek.
- " 24th. Saw the first woman - an Arab - since April.
- " 27th. Arrived Amarah.

October 1st. Quite cold at night.

- " 12th. River low.
- " 17th. Flea bag and sheet at night, wanting another blanket.
- " 19th. Very hot, but another blanket at night.
- " 20th. Sun sets before 5-30. Very dusty but not so hot - lots of flies.
- " 23rd. Gen. Sir Charles Munro shook hands with all Officers of the Division.
- " 25th. Very cold at night. blazing hot in the sun.
- " 26th. Had a swim as early as 3 p.m.
- " 27th. Night march, very cold sleeping in the open without blanket or great coat and wearing Khaki drill.
- " 29th. Cold again last night, every morning until 9 o'clock. I wear a Cardigan jacket and body belt. Now at 10 a.m I feel too hot with both these and my coat off.

November 4th. Wind from E.

- " 5th. First signs of rain since first half of May.
- " 9th. Potatoes first time since May.
- " 11th. Flies a horrible nuisance.
- " 21st. Bitterly cold getting up at 5.30 a.m.
- " 24th. Tried writing letter with fly paper on my head.
- " 26th. Left Amarah.
- " 28th. Arrived Basra.
- " 29th. Night Temp. 40 degrees.

December 11th. Left Basra for Bombay.

- " 14th. Called at Jaskh in Persian Beluchistan.
- " 15th. Near Karachi. A week ago had 6 Blankets & great coat over me in bed. now no blanket, & wind scoop in port hole and fan working.

It will be noticed that, though hitherto I have not written about cold, the above extracts refer often to it. The great contrast between night and day temperature in the spring and autumn was very marked and trying, and many officers came to Mesopotamia ignorant, to their discomfort, of the fact that heavy clothing was necessary in those seasons and in the winter. I was lucky enough to get hold of a pair of sheets. A sheet is much cooler to lie on than a blanket in the hot weather, and as the nights got cooler a sheet was sometimes acceptable over one when a blanket would have been too hot.

Water. The only source of supply in all the places I camped in was the river Tigris. This is very muddy in contrast with that of the Euphrates which is clear. I believe the Euphrates is, as it were, filtered by becoming a sort of marsh in part of its course.

The method of storage was this. Rectangular holes were dug in the ground about three feet deep, or mud walls were raised from the ground level. These were lined by a tarpaulin and covered by another. Each unit had its water mules and the water was carried in pakals or oblong flattened tin boxes slung one on either side of the pack saddle. The water was poured into the hole where the mud soon settled to the bottom. Bleaching powder was

afterwards ^{added} ~~put~~ in the proportion of about a
 teaspoonful to the hundred gallons. The life of
 a tarpaulin was short, holes forming in it,
 possibly owing to the action of the chlorine.
 When on trek, to avoid the expense of time and
 labour in digging a hole or building a wall,
 posts were driven into the ground and a tarpaulin
 slung up between them but resting on the ground.
 This served very well. There were very few
 regulation water carts about. Water carts were
 improvised from army transport carts by lining
 them with tarpaulin. Many soldiers could be seen
 drinking water straight from the river and fill
 their water bottles ^{from} ~~with~~ it. Seeing the Arabs do
 it with apparent impunity they could not under-
 stand why they ~~should~~ not do likewise. Tea made
 out of water containing too much chlorine was
 abominable stuff to drink. Boiling did not drive
 away the taste. We kept our drinking water cool
 by putting it in canvas bottles, or in porous
 earthenware vessels of native make called chatties.
 Our water bottles also which were covered with
 flannel would act in the same way if kept wet.
 These receptacles had to be kept off the ground,
 otherwise they were soon covered with ants and in
 any case flies flocked to them. The large chatties
 kept in mess tents undoubtedly ^{proved} ~~found~~ a ^{breeding} ~~breed~~ place
 for mosquitos etc. owing to the drips from them
 keeping the ground wet.

Sanitation. Scrupulous attention had to be paid to this. Trench latrines were done away with in permanent camps. Bee hive Incinerators were made out of empty kerosene tins and mud and all excreta were burnt along with horse litter, camp refuse and preserved food tins. These tins were afterwards put into big square holes and covered over with earth rammed down except at one point where a pipe or funnel emerged. One such hole would be used as a urinal, another for sullage. Kerosene and crude oil were sprinkled about. The cook house, latrines, officers mess etc. ^{were} sprayed every morning and evening with army fly spray. Flies had a greater dislike to Kerosene than to any other of these things. But in spite of all our efforts flies were there by the million. The principal fly breeding places in an apparently sanitary area were foul ground beneath latrine tins, horse litter accumulated for fuel near incinerator and undisturbed for more than forty-eight hours and incompletely buried offal.

Tinned food, Without tinned food we should of course have starved. That reminds me of the last words of advice given by his wife to an officer friend of mine, "Whatever you do don't touch any tinned stuff". It is remarkable how well it kept. I saw a few tins of an inferior brand of milk turned chocolate in colour. Ration cheese tins would sometimes show bulging ends, and blackened

corroded spots inside. I saw a good many Australian preserved rabbits gone bad. When we got down to Amarah, natives, from India many of them, were allowed to open canteens for the convenience of the soldiers. One of my duties was to keep a watchful eye on these fellows, and many a bulging tin of salmon etc. did I confiscate.

Morning Sick Parade. At least ten per cent of the battalion was on this parade. There was always diarrhoea, always fever of some sort or other, always "septic" or oriental sores and generally conjunctivitis and sometimes iritis.

The diarrhoea might be "simple". Some cases were attributed to the mechanical action of imperfectly sedimented water - "Tigritis" as it was named.

But many cases were of course dysenteric or belonged to the enteric group, Paratyphoid A. being the most common in Mesopotamia.

The fever cases were sandfly, enteric group or malaria. I don't remember whether any were diagnosed as dengue. If the disease did not abate in three or four days the men were transferred from the battalion hospital tent to the Field Ambulance. This was after the cholera epidemic had abated. The "septic" sores though painless, were inconvenient and took weeks and months to heal. Their site was any exposed part and were I think started by insect bites. The Leishman-Donovan body it was said could be isolated from the inflamed area surrounding

them, and they were said to give immunity from Kala Azar.

Heat Stroke was very common in June, July, August and even September. I was generally summoned to a batch of cases at about 3.30 p.m. The skin was dry and burning, Owing to the temperature of the air it was impossible to make accurate use of the clinical thermometer. Hysteria, delirium, stupor, mental confusion and incoherence of speech, acute mania and coma were seen in different cases. There was no ice and I kept them soused with water on a stretcher and in the cool of the evening transferred them to the Field Ambulance. I was told that some cases sent down to the General Hospitals as heat stroke had paratyphoid. I know that fever cases in hospital were subject to heat stroke as a complication and died from it.

I had experience only of the drug treatment of dysentery. I dont believe emetine was indiscriminately used because most of the cases were bacillary, and I know nothing of the results of serum treatment. I saw one man with a hole made in his large gut for lavage at Amarah. I believe he got on well.

Febrile Jaundice was common and was believed to be associated with diarrhoea. They were all transferred to the Field Ambulance, thence to the General Hospital. As a rule they took a long time to recover.

Ber-Beri This disease occurred amongst British soldiers. Indian troops were practically free from the disease. This was probably due to the daily issue to the Indian troops of Dhall which is rich in Anti Ber-Beri vitamins. The most valuable remedy is Yeast. It can also be used as a prophylactic when troops are under trying dietetic conditions in the form of Yeast Extract or "Marmite" which looks like Extract of Meat and tastes like it. It was supplied in $\frac{1}{4}$ oz cubes, one to be taken twice a week, dissolved in warm water or eaten alone or with biscuits or bread. One of the earliest signs to be looked for is the "Squatting Test", i.e. inability to assume the squatting posture and resume the erect with the hands at the side. The Beri-Beri season in Mesopotamia is September to January, the maximum incidence being in November.

Scurvy. I saw several cases in Indian troops in Hospital at Amarah demonstrated by Capt. Ke^m at I.M.S. They showed the debility, anaemia, g^{um} changes and haemorrhages. The commonest localities involved by haemorrhage were the ham, calf, ankle, and flex^xor surface of forearm. Some cases had subconjunctival, petechial pleural or subperiosteal haemorrhages and ^{haemorrhages} into joints. The blood effusions were remarkably hard, the skin over them being as a rule discoloured.

Capt. K^m~~at~~ could not come to any definite conclusions regarding predisposing causes in the 130 cases he had treated. The treatment adopted was mouth disinfection, complete rest, fresh milk, fresh boiled vegetables, onions, and fresh limes. A man was courtmartialled and punished for attempting to simulate scurvy by the application of an irritant to his gums.

Wounds healed readily as in the South African War. I saw no case of tetanus or gas gangrene.

Phthisis. I saw cases of early phthisis in men just out from home. I don't know how the climate suits this disease.

Plague - Smallpox. I saw no cases.

I finish with a few odds and ends. Eye diseases appeared to be exceedingly common amongst the Arabs. The dust in dust storms is quite possibly sterile owing to exposure to the sun. A certain amount of exercise is good even in the hot weather if taken at the proper time. The best age to stand the Mesopotamian climate is I should say round about thirty. Youths soon wilted away. Memory, the power of concentration, vision and hearing are I think impaired by residence in

Mesopotamia. A cheery man is a great asset to a unit. Successful efforts were made with the cooler weather to improve the morale of the troops by band music, concerts and the encouragement of sports, regattas, polo, hockey, football and boxing. But few only of the "original" men were left. The battalion I was attached to had only about a dozen men left of the "originals".

Since writing the above, I have had the very good fortune of meeting my friend Robert Francis Jones, late Temporary Captain R.A.M.C. We went out to Mesopotamia together, but we parted at Basra, and came home from Bombay together. He had worked in India for three years before the war, and was for twelve months Pathologist to the Connaught Hospital Aldershot.

In Mesopotamia he was for two months in charge of the Makina Masus Camp, Basra, and for six months he worked at the Central Laboratory, Amarah, with Major Percival Mackie I.M.S. and Captain Stevenson I.M.S.

At Amarah there were unrivalled opportunities for the study of diseases of the tropics. To his courage and insistence are due the sweeping sanitary reforms at Makina Masus, but others have reaped the reward. He has refreshed my memory on many points, confirmed observations which I have already put down, and has given me much additional and definite information on subjects about which I was somewhat hazy. To Jones is due the introduction into Mesopotamia in April 1916 of Horrock's Bleaching Powder method and the gradual abandonment of the Treherne-Nelson method of sterilising water. He proved by a series of culture experiments the inefficiency of the latter method.

Malaria. About the most common disease in Mesopotamia. Major Christophers I.M.S. one of the greatest authorities on the subject stated that in 1916 he had not met a single case at the front which could definitely be proved to have been infected above Basra. The mosquitoes, which were very numerous, were Anopheles Pulcherrima with dappled grey wings, rarely found in India or anywhere out of Arabia.

Sandfly Fever. (1) Great frequency. (2) Subsequent prostration and irritability. I can vouch for both these facts from personal experience.

Dysentery. Perhaps the infection which provided more cases than any other. In British troops the variety was chiefly bacillary and not amæbic. The bacilli found were Shiga's, Fle^{xn}schner's and other bacilli resembling them but not conforming in all sugar reactions. Wenyon found amoebic dysentery relatively rarely, and so the indiscriminate use of emetine was opposed to established fact. There was difficulty in getting correct bacteriological diagnosis in most cases because the laboratory was not able to obtain material from the cases in the first few days of the illness, when finding is most easy. Dysentery was extremely frequent even late in 1916.

About 30% of the troops coming up from Basra by road went sick with dysentery at "Rest Stations" before reaching the front.

In the cases of Protozoal Dysentery *Amoeba histolytica* was the most frequent and *Balantidium Coli* fairly so.

A noteworthy fact was that Acton found protozoa in the stools of Indian troops to the extent of 60% even though not showing symptoms of disease, the varieties found being chiefly *Amoeba*, *Balantidium* and *Lamblia*. They were chronic carriers, what Wenyon calls "parasiticised".

Enteric Group. Perhaps the most serious from the point of view of mortality.

60% of cases were Para A.

20% " " " Typhoid.

20% " " " Para B.

Para A. had quite a high rate of mortality, owing to unfitness of patients, onset of heat stroke etc, In the laboratory most cases were proved by direct culture of organism from the blood. When cases had never been inoculated or had only been inoculated against Typhoid, the Widal test gave reliable results for Para A. or B. But in cases who had had T.A.B.inoculation the results of the Widal test were on the whole unsatisfactory, fluctuations in the agglutinating curve shown by repeated tests being the only guide, and in fact an almost useless guide.

Cholera. Most of the severe epidemics were due to infected country milk. Once at two hospitals in Amarah about sixty cases occurred in two days from this cause. As far as one could judge the inoculation against Cholera did not confer immunity. This goes against the impression which I had formed.

Tests for Cholera.

1. The presence of the vibrio in the stool is no proof of cholera as it is often absent in undoubted cases and may be present in health.
2. Culture in peptone water and on selective media were often difficult and uncertain even in the hands of an expert like Major Mackie.
3. The use of the blood for agglutination test against standard stock culture of cholera vibrio is not of much value as the reaction is present only in convalescence.